



# ENAC12002 *Steel and Concrete Design*

## Term 1 - 2019

Profile information current as at 03/05/2024 11:10 pm

All details in this unit profile for ENAC12002 have been officially approved by CQUUniversity and represent a learning partnership between the University and you (our student). The information will not be changed unless absolutely necessary and any change will be clearly indicated by an approved correction included in the profile.

### General Information

#### Overview

This unit is a basic introduction to structural design that develops students understanding of the design process and equips students to prepare simple designs under supervision of a professional engineer. It builds on structural analysis skills developed in Applied Structural Analysis. The unit presents the structural properties of steel and concrete. Students design simple reinforced concrete and steel members and structural connections to meet strength and serviceability requirements and provide clear documentation of their analysis and design. Students are required to communicate, work and learn, both individually and in teams in a professional manner. Distance education (FLEX) students will be required to have access to a computer, and make frequent use of the Internet.

#### Details

Career Level: *Undergraduate*

Unit Level: *Level 2*

Credit Points: 6

Student Contribution Band: 8

Fraction of Full-Time Student Load: 0.125

#### Pre-requisites or Co-requisites

Prereq: ENAC12003 Applied Structural Analysis or ENEG11006 Engineering Statics

Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the [Assessment Policy and Procedure \(Higher Education Coursework\)](#).

#### Offerings For Term 1 - 2019

- Online

#### Attendance Requirements

All on-campus students are expected to attend scheduled classes – in some units, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. International students, on a student visa, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for International students is defined as maintaining at least an 80% attendance record).

#### Website

[This unit has a website, within the Moodle system, which is available two weeks before the start of term. It is important that you visit your Moodle site throughout the term. Please visit Moodle for more information.](#)

## Class and Assessment Overview

### Recommended Student Time Commitment

Each 6-credit Undergraduate unit at CQUniversity requires an overall time commitment of an average of 12.5 hours of study per week, making a total of 150 hours for the unit.

### Class Timetable

#### [Regional Campuses](#)

Bundaberg, Cairns, Emerald, Gladstone, Mackay, Rockhampton, Townsville

#### [Metropolitan Campuses](#)

Adelaide, Brisbane, Melbourne, Perth, Sydney

### Assessment Overview

#### 1. **Written Assessment**

Weighting: 30%

#### 2. **Written Assessment**

Weighting: 35%

#### 3. **Written Assessment**

Weighting: 35%

### Assessment Grading

This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the [University's Grades and Results Policy](#) for more details of interim results and final grades.

## CQUniversity Policies

**All University policies are available on the [CQUniversity Policy site](#).**

You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the [CQUniversity Policy site](#).

## Previous Student Feedback

### Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

#### Feedback from Moodle unit evaluation

##### Feedback

Lecturer was fantastic, and the lecture videos were short and to the point, they clearly explained the methods that were required to succeed in the unit.

##### Recommendation

Good to know that the content and resources were useful towards learning progress and knowledge development.

#### Feedback from Moodle unit evaluation

##### Feedback

Would like to have textbook for Steel Section of the unit.

##### Recommendation

This good practice will continue. Steel section included "resource readings". Reference textbooks will be added to the list.

## Unit Learning Outcomes

### On successful completion of this unit, you will be able to:

1. Describe process for the design of safe and serviceable structures and the roles and responsibilities of those involved. [1-4]
2. Describe the basic structural properties of concrete, reinforcing steels and structural steel. [1-4]
3. Design steel and reinforced concrete flexural members [1-4].
4. Design steel tension members and short columns of steel and reinforced concrete, and describe the design procedure for slender column design. [1-4]
5. Design members subjected to combined actions. [1-4]
6. Design structural connections. [1-4]
7. Design of structures to meet serviceability requirement include durability, fire resistance, limiting deflection, constructability and demolition/ recycling. [1-4]
8. Produce engineering documentation of structural analyses and designs. [1-4]
9. Communicate, work and learn, both individually and in teams in a professional manner. [2, 6, 9, 10]

## Alignment of Learning Outcomes, Assessment and Graduate Attributes



### Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes								
	1	2	3	4	5	6	7	8	9
1 - Written Assessment - 30%	•	•	•					•	•
2 - Written Assessment - 35%				•	•		•	•	•
3 - Written Assessment - 35%						•	•	•	•

## Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes								
	1	2	3	4	5	6	7	8	9
1 - Communication	•	•	•	•	•	•	•	•	•
2 - Problem Solving	•	•	•	•	•	•	•	•	•
3 - Critical Thinking	•	•	•	•	•	•	•	•	•
4 - Information Literacy	•	•	•	•	•	•	•	•	•
5 - Team Work									
6 - Information Technology Competence	•	•	•	•	•	•	•	•	•
7 - Cross Cultural Competence	•	•	•	•	•	•	•	•	
8 - Ethical practice	•	•	•	•	•	•	•	•	
9 - Social Innovation									
10 - Aboriginal and Torres Strait Islander Cultures									

## Alignment of Assessment Tasks to Graduate Attributes

Assessment Tasks	Graduate Attributes									
	1	2	3	4	5	6	7	8	9	10
1 - Written Assessment - 30%	•	•	•	•		•	•	•		
2 - Written Assessment - 35%	•	•	•	•		•	•	•		
3 - Written Assessment - 35%	•	•	•	•		•	•	•		

## Textbooks and Resources

### Textbooks

ENAC12002

#### Prescribed

##### **Reinforced Concrete: The Designers Handbook**

(2013)

Authors: Beletich, Hymas, Reid & Uno

Cement and Concrete Services

Baulkham Hills, NSW, Australia

ISBN: 978-0-646-59485-9

Binding: Paperback

#### **Additional Textbook Information**

Paper copies are available at the CQUni Bookshop here: <http://bookshop.cqu.edu.au> (search on the Unit code)

[View textbooks at the CQUniversity Bookshop](#)

### IT Resources

**You will need access to the following IT resources:**

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)
- Microphone and headset

## Referencing Style

All submissions for this unit must use the referencing style: [Harvard \(author-date\)](#)  
For further information, see the Assessment Tasks.

## Teaching Contacts

**Hassan Baji** Unit Coordinator

[h.baji@cqu.edu.au](mailto:h.baji@cqu.edu.au)

## Schedule

### **Week 1 - 11 Mar 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Introduction to Structural Design, Limit State Design, Estimation of Loads on the Structure		

### **Week 2 - 18 Mar 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Reinforced Concrete Design: Beam Design I		

### **Week 3 - 25 Mar 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Reinforced Concrete Design: Beam Design II		

**Week 4 - 01 Apr 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Reinforced Concrete Design: One way Slab Design		

**Week 5 - 08 Apr 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Reinforced Concrete Design: Two-way Slab Design		<b>Assignment 1</b> Due: Week 5 Monday (8 Apr 2019) 11:45 pm AEST

**Vacation Week - 15 Apr 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Vacation week		

**Week 6 - 22 Apr 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Reinforced Concrete Design: Column Design		

**Week 7 - 29 Apr 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Steel Design: Introduction to the Steel Design		

**Week 8 - 06 May 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Steel Design: Design of Tension Members		

**Week 9 - 13 May 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Steel Design: Design of Compression Members		

**Week 10 - 20 May 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Steel Design: Design of Bending Members		<b>Assignment 2</b> Due: Week 10 Monday (20 May 2019) 11:45 pm AEST

**Week 11 - 27 May 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Steel Design: Design of Webs in Shear and Bearing		

**Week 12 - 03 Jun 2019**

Module/Topic	Chapter	Events and Submissions/Topic
Steel Design: Design of connections		

**Review/Exam Week - 10 Jun 2019**

Module/Topic	Chapter	Events and Submissions/Topic
		<b>Assignment 3</b> Due: Review/Exam Week Monday (10 June 2019) 11:45 pm AEST

**Exam Week - 17 Jun 2019**

Module/Topic	Chapter	Events and Submissions/Topic

## Assessment Tasks

# 1 Assignment 1

## Assessment Type

Written Assessment

## Task Description

This assessment has questions to cover the content from weeks 1 to 3. Assessment questions include theory, analysis and design of structural elements. Questions will be available via Moodle unit web site at the beginning of the term.

## Assessment Due Date

Week 5 Monday (8 Apr 2019) 11:45 pm AEST

## Return Date to Students

Week 7 Monday (29 Apr 2019)

## Weighting

30%

## Minimum mark or grade

30% of the Assignment 1 marks

## Assessment Criteria

(5%) Presentation and layout—includes the selection of typeface, written and general appearance, detail and quality of the assessment item submission

(90%) Content—includes the accuracy and relevance of information, application of knowledge, language and grammar used in answering questions, and proper referencing of sources of information, equations, images, data and tables used in the assessment submission. When referencing, use of the Harvard Referencing System

(5%) Reference - Use of the Harvard Referencing System. Harvard referencing guide can be available via course profile.

## Referencing Style

- [Harvard \(author-date\)](#)

## Submission

Online

## Submission Instructions

Must be submitted as a single word or pdf file. Hand-written answers are accepted and must use pen or 2B pencil. Students should scan the hand-written answers and submit it as a pdf file for online submission.

## Learning Outcomes Assessed

- Describe process for the design of safe and serviceable structures and the roles and responsibilities of those involved. [1-4]
- Describe the basic structural properties of concrete, reinforcing steels and structural steel. [1-4]
- Design steel and reinforced concrete flexural members [1-4].
- Produce engineering documentation of structural analyses and designs. [1-4]
- Communicate, work and learn, both individually and in teams in a professional manner. [2, 6, 9, 10]

## Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence
- Cross Cultural Competence
- Ethical practice

# 2 Assignment 2

## Assessment Type

Written Assessment

## Task Description

This assessment has questions to cover the content from weeks 4 to 8. Assessment questions include theory, analysis and design of structural elements. Questions will be available via Moodle unit web site at the beginning of the term.

## Assessment Due Date

Week 10 Monday (20 May 2019) 11:45 pm AEST

**Return Date to Students**

Week 12 Monday (3 June 2019)

**Weighting**

35%

**Minimum mark or grade**

30% of the Assignment 2 marks

**Assessment Criteria**

(5%) Presentation and layout—includes the selection of typeface, written and general appearance, detail and quality of the assessment item submission

(90%) Content—includes the accuracy and relevance of information, application of knowledge, language and grammar used in answering questions, and proper referencing of sources of information, equations, images, data and tables used in the assessment submission. When referencing, use of the Harvard Referencing System

(5%) Reference - Use of the Harvard Referencing System. Harvard referencing guide can be available via course profile.

**Referencing Style**

- [Harvard \(author-date\)](#)

**Submission**

Online

**Learning Outcomes Assessed**

- Design steel tension members and short columns of steel and reinforced concrete, and describe the design procedure for slender column design. [1-4]
- Design members subjected to combined actions. [1-4]
- Design of structures to meet serviceability requirement include durability, fire resistance, limiting deflection, constructability and demolition/ recycling. [1-4]
- Produce engineering documentation of structural analyses and designs. [1-4]
- Communicate, work and learn, both individually and in teams in a professional manner. [2, 6, 9, 10]

**Graduate Attributes**

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence
- Cross Cultural Competence
- Ethical practice

## 3 Assignment 3

**Assessment Type**

Written Assessment

**Task Description**

This assessment has questions to cover the content from weeks 9 to 12. Assessment questions include theory, analysis and design of structural elements. Questions will be available via Moodle unit web site on or before week-8 of the term.

**Assessment Due Date**

Review/Exam Week Monday (10 June 2019) 11:45 pm AEST

**Return Date to Students**

After the Grade Release

**Weighting**

35%

**Minimum mark or grade**

30% of the Assignment 3 marks

**Assessment Criteria**

(5%) Presentation and layout—includes the selection of typeface, written and general appearance, detail and quality of the assessment item submission

(90%) Content—includes the accuracy and relevance of information, application of knowledge, language and grammar used in answering questions, and proper referencing of sources of information, equations, images, data and tables used in the assessment submission. When referencing, use of the Harvard Referencing System



(5%) Reference - Use of the Harvard Referencing System. Harvard referencing guide can be available via course profile.

### **Referencing Style**

- [Harvard \(author-date\)](#)

### **Submission**

Online

### **Learning Outcomes Assessed**

- Design structural connections. [1-4]
- Design of structures to meet serviceability requirement include durability, fire resistance, limiting deflection, constructability and demolition/ recycling. [1-4]
- Produce engineering documentation of structural analyses and designs. [1-4]
- Communicate, work and learn, both individually and in teams in a professional manner. [2, 6, 9, 10]

### **Graduate Attributes**

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence
- Cross Cultural Competence
- Ethical practice

## Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.

Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.

When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.

Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

As a student, you are responsible for reading and following CQUniversity's policies, including the [Student Academic Integrity Policy and Procedure](#). This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

### What is a breach of academic integrity?

A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

### Why is academic integrity important?

A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

### Where can I get assistance?

For academic advice and guidance, the [Academic Learning Centre \(ALC\)](#) can support you in becoming confident in completing assessments with integrity and of high standard.

### What can you do to act with integrity?



#### Be Honest

If your assessment task is done by someone else, it would be dishonest of you to claim it as your own



#### Seek Help

If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)



#### Produce Original Work

Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem